Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554

In the Matter of	)	
	)	
Amendment of Parts 13 and 80 of the	)	WT Docket No. 00-48
Commission's Rules Concerning	)	
Maritime Communications	)	
	)	
Petition for Rule Making Filed by Globe	)	RM-9499
Wireless, Inc.	)	

COMMENTS OF THE RADIO TECHNICAL COMMISSION FOR MARITIME SERVICES (RTCM)

The Radio Technical Commission for Maritime Services (RTCM) respectfully submits these Comments in response to the Report and Order and Further Notice of Proposed Rulemaking (Notice) RM-9499 released April 9, 2002 in the above-captioned proceeding.

The RTCM is a non-profit organization whose objectives include studying and preparing reports on maritime telecommunications practices, needs and technologies with a view toward improving the efficiency and capabilities of maritime telecommunications services, suggesting ways to keep rules and regulations to the minimum essential for effective maritime telecommunications and making recommendations on important issues involving maritime telecommunications.

In regard to the Further Notice of Proposed Rule Making, Para 119, Digital Selective Calling Equipment:

The Commission sought comment on the proposed amendment to Section 80.225 of the current rules, as set forth in Annex C of the FNPRM, including grandfathering of existing equipment if the proposal is adopted and, further, whether amendments to Section 80.225 are warranted in light of continued revisions to DSC requirements being considered by both ITU and IEC.

The RTCM notes that the ITU and IEC work encompasses consideration of matters such as those in the proposed changes in Annex C of the FNPRM and as well as other changes expected to improve the overall operation of DSC. Work in both the ITU and the IEC is in advanced stages, and it appears likely that by spring of 2003 there will be published both a new ITU Recommendation ITU-R M.493-11 and the new IEC VHF DSC Class D Standard 62238 Edition 1.

Under these circumstances the RTCM is of the view that no changes should be made to existing Part 80 rules dealing with DSC standards until both ITU Recommendation ITU-R M.493-11 and the IEC 62238.Edition 1 Class D standard have been adopted.

RTCM is of the view that consideration of appropriate phase-in dates of new equipment and grandfathering of old equipment is always essential for the benefit of both consumers and manufacturers.

At such time as both the ITU and IEC new DSC related standards are completed, the RTCM respectfully requests that a further Notice of Proposed Rulemaking be issued to consider adoption of the new standards in the FCC rules as replacement for existing regulatory requirements..

In regard to the Further Notice of Proposed Rule Making, Para 121, INMARSAT-E EPIRB's:

RTCM supports the proposal by the GMDSS Task Force, and the recommendations of the U.S. Coast Guard in favor of the authorization of INMARSAT-E EPIRBs for U.S. vessels. RTCM recommends that the Commission adopt standard IEC 61097-5 by reference as the basis for authorization, as suggested in the Coast Guard comments. In its comments, the Coast Guard lists six additional conditions for acceptance of INMARSAT-E EPIRBs on U.S. vessels. RTCM has examined each of these and offers the following comments:

1. The INMARSAT-E EPIRB "provides for locating (homing) on 121.5 MHz.": IEC 61097-5 provides for an optional 121.5 MHz homing device. The specifications and test methods for the 121.5 MHz homing device in Annex B of IEC 61097-5 are virtually identical to the 121.5 MHz homing device specifications in the RTCM Recommended Standards for 406 MHz Satellite EPIRBs. The RTCM standards are the basis for authorization of 406 MHz satellite EPIRBs in 47 CFR 80.1061. Therefore, Commission rules will need to specifically state a requirement for the homing device in accordance with Annex B of IEC 61097-5.

2. The INMARSAT-E EPIRB "includes a strobe light which complies with RTCM Recommended Standards for 406 MHz EPIRBs, Version 2.1, August 22, 2000.": Paragraph 5.3.6 of IEC 61097-5 provides for a low duty cycle light which has an effective luminous intensity of at least 0.75 cd, and flashes not less than 20 times per minute, with a flash duration of between 10^{-6} to 1 second. The RTCM standards also require a light with effective luminous intensity of at least 0.75 cd, but flash rate is limited to between 20 and 30 times per minute, and flash duration is limited to between 10^{-6} and 10^{-2} second, thereby requiring a "strobe" light. The IEC test method for the light is more extensive than the RTCM standards. Therefore, RTCM recommends that the light flash rate and flash duration be specified in the Commission's rules, but reference to the RTCM standards for 406 MHz EPIRBs is not necessary in this case.

3. The INMARSAT-E EPIRB "requires a suitable two-step means of activation which complies with the RTCM standard.": Paragraph 5.4.2 of IEC 61097-5 specifies that the manual alert activation and deactivation must both require two independent actions. RTCM concludes that the manual switch control functions required under IEC 61097-5 are comparable to the RTCM standards for 406 MHz EPRIBs. Therefore, the Commission does not need to require any special manual switch requirements in its regulations.

4. The INMARSAT-E EPIRB "if intended for automatic activation, is designed to operate automatically only when the beacon is both out of its mounting bracket and submerged in water, in compliance with the RTCM standard.": Paragraph 5.4.3 of IEC 61097-5 requires that the EPIRB not be automatically activated by removing it from its float-free release mechanism. Paragraph 5.3.2 requires that the EPIRB be automatically activated after floating free, or when floating irrespective of the setting of any control. There is no specific requirement for the automatic activation mechanism to actually be decoupled when the EPIRB is in its mounting bracket. However, paragraph 8.1.9 of IEC 61097-5 does include a "fire hose" test which is virtually identical to the one in the RTCM standard for 406 MHz EPIRBs. The EPIRB in its bracket may not release from the bracket, nor activate as a result of this test. RTCM concludes that protection of the automatic activation function under IEC 61097-5 is substantially the same as required under the RTCM standard for 406 MHz EPRIBs. Therefore, the Commission does not need to include a special requirement in its regulations for this purpose.

5. The INMARSAT-E EPIRB "is capable of providing regular non-manual position updates after the beacon floats free.": Paragraph 5.3.3 of IEC 61097-5 requires the EPIRB to be equipped with a search and rescue radar transponder (SART) unless integral facilities are included for automatic position updating after activation using a Global Positioning System (GPS) receiver. SARTs do not provide any location information through the satellite system, so the EPIRB is more difficult to locate after it has drifted from its launch position. INMARSAT-E EPIRBs without onboard

Global Navigation Satellite System (GNSS) receivers get their position information from the ship's navigation system, and when the EPIRB is separated from the ship, the ability to update that information is lost. Furthermore, the geostationary INMARSAT satellite system does not have the capability of determining the location of a beacon through Doppler frequency shift location techniques, as the low-earth-orbiting "COSPAS-SARSAT" satellites do. Therefore, RTCM recommends that the Commission's regulations require INMARSAT-E EPIRBs be equipped with a GNSS receiver, to provide regular non-manual position updates. (GNSS includes GPS as well as the Russian GLONASS (GLObal NAvigation Satellite System) system.)

6. The INMARSAT-E EPIRB "has an associated registration database that fully complies with the data requirements of IMO Assembly Resolution A.887(21).": INMARSAT does provide an associated registration database that meets the Coast Guard's intent. However, the Commission will also need to include a provision for mandatory registration, as for 406 MHz satellite EPIRBs.

RTCM has also carefully compared test requirements in IEC 61097-5 with the RTCM standards for 406 MHz EPIRBs, and finds that they are generally comparable, with IEC 61097-5 exceeding the RTCM standards in several areas. However, there are some important differences that should be considered in developing the Commission's regulations, as follows:

1. IEC 61097-5 has no drop test onto a hard surface. Since EPIRBs can easily be dropped during handling, RTCM recommends that EPIRBs be subjected to the 1 m drop test described in the RTCM standards (paragraph A8.1).

2. IEC 61097-5 has two immersion tests that total 10 minutes of operation under water. The RTCM standards (paragraph A9.0) have a more comprehensive immersion test requiring storage for one hour at 65° C, immediately followed by immersion in 20° C water for 48 hours. RTCM recommends that this test be included.

3. IEC 61097-5 includes a high-temperature thermal shock test. The RTCM standards (paragraph A11.1) include not only this high temperature shock test, but also a low-temperature shock test where an EPRIB which has been stowed at -30° C is immediately immersed in 0° C water and is required to operate. Although INMARSAT-E EPIRBs can not be used on ships in polar areas, coverage does extend to all Alaskan coastal waters. Therefore, RTCM recommends that the RTCM low-temperature shock test be required.

4. IEC 61097-5 does not require a test of the self-test function. RTCM recommends that the test of the self-test function in the RTCM standards be included (paragraph A13.3).

5. Although IEC 61097-5 extracts certain requirements from International Maritime Organization (IMO) resolution A.662(16) on float-free release mechanisms, it does not require a full evaluation of the mechanism under that standard. RTCM therefore

recommends that the Commission require Coast Guard approved float-free release mechanisms by reference to the RTCM standards on that subject (paragraph 2.3.2.1).

6. IEC 61097-5 does not include a humidity test. RTCM believes that this is an important test, and that the humidity test requirements from the RTCM standards be included (paragraph A18.0).

7. The RTCM standards include an orientation test to demonstrate that the EPIRB will transmit in any position. This test was included, in part, to prevent the use of gravity switches as a means of automatic activation. IEC 61097-5 has no such test. RTCM recommends that the commission include a requirement for the RTCM test (paragraph A19.0).

(The paragraphs in the RTCM standard referred to above, are attached at annex.)

RTCM respectfully offers the following draft language for a new section under Subpart V which closely parallels 47 CFR 80.1061, and incorporates the comments discussed above.

§ [80.1063] Special requirements for INMARSAT-E EPIRBs.

(a) Notwithstanding the provisions in paragraph (c) of this section, INMARSAT-E EPIRBs must meet all the technical and performance standards contained in IEC standard 61097-5 titled "Global maritime distress and safety system (GMDSS) – Part 5: INMARSAT-E – Emergency position indicating radio beacon (EPIRB) operating through the INMARSAT system – Operational and performance requirements, methods of testing and required test results", first edition 1997-12. This IEC standard is incorporated by reference in accordance with 5 U.S.C. 552(a). The document is available for inspection at Commission headquarters in Washington, D.C. or may be obtained from the American National Standards Institute (ANSI), 25 West 43rd Street, New York, NY 10036, Telephone: 212-642-4980, Fax: 212-302-1286, www.nssn.org.

(b) INMARSAT-E EPIRBs must also meet the additional requirements in paragraphs (c) and (d) of this section contained in the Radio Technical Commission for Maritime Services document titled "RTCM Recommended Standards for 406 MHz Satellite Emergency Position-Indicating Radiobeacons (EPIRBs)" version 2.1, dated June 20, 2002 (RTCM Paper 77-2002/SC110-STD). This RTCM document is incorporated by reference in accordance with 5 U.S.C. 552(a). The document is available for inspection at Commission headquarters in Washington, D.C. or may be obtained from the Radio Technical Commission for Maritime Services, 1800 Diagonal Road, Suite 600, Alexandria, VA 22314. Phone 703-684-4481; Fax 703-684-4229; www.rtcm.org.

(c) The INMARSAT-E EPIRB must also incorporate as integral features –

(1) A "homing" beacon operating only on 121.500 MHz that meets all the requirements described in Annex B of IEC standard 61097-5;

(2) A low duty cycle light which meets IEC standard 61097-5, except that the flash rate must be between 20 and 30 times per minute, and flash duration must be between 10^{-6} and 10^{-2} second;

(3) A Global Navigation Satellite System (GNSS) receiver (such as a Global Positioning System (GPS) receiver), to provide regular non-manual position updates in the message transmitted by the beacon, after the beacon floats free; and

(4) An automatic release mechanism which meets paragraph 2.3.2.1 of the RTCM Recommended Standards.

(d) The INMARSAT-E EPIRB must pass the following additional tests described in Appendix A of the RTCM Recommended Standards:

(1) A8.1 - Drop test on hard surface.

(2) A9.0 - Leakage and immersion tests.

(3) A11.1 – Low-Temperature thermal Shock Test.

(4) A13.3 – Self-test, except that the 406 MHz RF requirements do not apply. The requirements for self-test characteristics in IEC 61097-5 apply instead.

(5) A18.0 – Humidity.

(6) A19.0 – Orientation.

(e) Prior to submitting a certification application for an INMARSAT-E radiobeacon, the radiobeacon must be certified by INMARSAT as meeting IEC 61097-5. Additionally, the radiobeacon must be tested to the environmental and operational test procedures identified in paragraph (d) of this section, by the test facility which conducted the INMARSAT certification tests, or a test facility accepted by the U.S. Coast Guard. Information regarding accepted test facilities may be obtained from Commandant (G-MSE), U.S. Coast Guard, 2100 2nd Street SW, Washington, DC 20593-0001, http://www.uscg.mil/hq/g-m/mse/lablist/161.011.htm.

(1) After an INMARSAT-E EPIRB has been tested by the test facility, the following information must be submitted in duplicate to the Commandant (G-MSE), U.S. Coast Guard, 2100 2nd Street SW, Washington, DC 20593-0001:

(i) The name of the manufacturer or grantee, the model number of the EPIRB, and its FCC ID Code;

(ii) Copies of the INMARSAT certification to IEC 61097-5;

(iii) Copies of the test report and test data obtained from the test facility showing that the radiobeacon complies with the IEC 61097-5 tests and the tests in paragraph (d) of this section; and

(iv) Instruction manuals associated with the radiobeacon, description of the test characteristics of the radiobeacon including assembly drawings, electrical schematics, description of parts list, specifications of materials and the manufacturer's quality assurance program.

(2) After reviewing the information described in paragraph (e)(1) of this section the U.S. Coast Guard will issue a letter stating whether or not the radiobeacon satisfies the relevant requirements.

(f) A certification application for an INMARSAT-E EPIRB submitted to the Commission must also contain a copy of the U.S. Coast Guard letter that states the radiobeacon satisfies the relevant requirements, a copy of the technical test data, and the instruction manual(s).

(g) With each marketable EPIRB unit the manufacturer or grantee must include appropriate material for registration of the EPIRB with INMARSAT, along with a warning that failure to register the EPIRB could delay rescue services in an emergency.

(h) To enhance protection of life and property it is mandatory that each INMARSAT-E EPIRB be registered with INMARSAT before installation and that information be kept up-to-date. Therefore, in addition to the identification plate or label requirements contained in §§2.925, 2.926 and 2.1003 of this chapter, each INMARSAT-E EPIRB must be provided on the outside with a clearly discernable permanent plate or label containing the following statement: "The owner of this INMARSAT-E EPIRB must register the identification code contained on this label with INMARSAT whose address is: Inmarsat, 99 City Road, London, EC1Y 1AX, United Kingdom." Vessel owners shall advise INMARSAT in writing upon change of vessel or EPIRB ownership, transfer of EPIRB to another vessel, or any other change in registration information.

(i) For INMARSAT-E EPIRBs whose identification code can be changed after manufacture, the identification code shown on the plate or label must be easily replaceable using commonly available tools.

In addition, RTCM believes that a number of other conforming amendments to the regulations are necessary to provide for the use of INMARSAT EPIRBs, specifically:

1. A reference to INMARSAT-E EPIRBs should be added to 47 CFR §§80.15(e)(2), 80.905(a)(3)(vi), 80.905(a)(4)(vi), and 80.1085(a)(6)(i). These sections should also note that the INMARSAT-E EPIRB is not authorized for ships which travel outside the INMRSAT coverage area. Appropriate revisions are proposed here:

47 CFR 80.15(e)(2) should be revised as follows:

(2) A 406.0-406.1 MHz EPIRB may be used by any ship required by U.S. Coast Guard regulations to carry an EPIRB or by any ship that is equipped with a VHF ship radio station. An INMARSAT-E EPIRB may be used by any ship required by U.S. Coast Guard regulations to carry an EPIRB or by any ship that is equipped with a VHF ship radio station, provided that the ship is not operating in maritime sea area A4 as defined in in §80.1069(a)(4) of this part.

47 CFR 80.905(a)(3)(vi) should be revised as follows:

(vi) Be equipped with a Category 1 406.0-406.1 MHz satellite emergency position-indicating radiobeacon (EPIRB) meeting the requirements of § 80.1061, or if the ship is not operating in maritime sea area A4 as defined in §80.1069(a)(4) of this part, an automatic float-free INMARSAT-E EPIRB meeting the requirements of § [80.1063]; and

47 CFR 80.905(a)(4)(vi) should be revised as follows:

(vi) Be equipped with a Category 1 406.0-406.1 MHz satellite emergency position-indicating radiobeacon (EPIRB) meeting the requirements of § 80.1061, or if the ship is not operating in maritime sea area A4 as defined in

§80.1069(a)(4) of this part, an automatic float-free INMARSAT-E EPIRB meeting the requirements of § [80.1063];

47 CFR 80.1085(a)(6)(i) should be revised as follows:

(i) Capable of transmitting a distress alert through either the polar orbiting satellite service operating in the 406.0-406.1 MHz band (406.0-406.1 MHz EPIRB), or if the ship is not operating in maritime sea area A4 as defined in §80.1069(a)(4) of this part, the 1.6 GHz band (INMARSAT-E EPIRB); and

2. INMARSAT-E EPIRBs should be permitted under 47 CFR §§80.1087(a)(2), 80.1089(a)(3)(i), 80.1091(a)(4)(i), and 80.1091(b)(3). Section 80.1093(a) should include a prohibition on the authorization of INMARSAT-E EPIRBs on ships permitted to operate in all sea areas. Appropriate revisions are proposed here:

47 CFR 80.1087(a)(2), 80.1089(a)(3)(i), and 80.1091(a)(4)(i), 80.1091(b)(3)(i), should be revised as follows:

(-) Through the polar orbiting satellite service on 406.0-406.1 MHz or the INMARSAT-E service in the 1.6 GHz band (this requirement may be fulfilled by the EPIRB required by §80.1085(a)(6) of this part, either by installing the EPIRB close to, or by allowing remote activation from, the position from which the ship is normally navigated); or

47 CFR 80.1091(b)(3) should be revised by redesignating subparagraph (ii) as (iii) and inserting a new subparagraph (ii) as follows:

(ii) Through the INMARSAT-E service in the 1.6 GHz band (this requirement may be fulfilled by the EPIRB required by §80.1085(a)(6) of this part, either by installing the EPIRB close to, or by allowing remote activation from, the position from which the ship is normally navigated); or

47 CFR 80.1093(a) should be revised as follows:

(a) In addition to meeting the requirements of § 80.1085, ships engaged on voyages in all sea areas must be provided with the radio installations and equipment required by § 80.1091(b), except that the equipment required by §§ 80.1091(b)(3)(ii) and 80.1091(b)(3)(iii) cannot be accepted as an alternative to that required by regulation § 80.1091(b)(3)(i), which must always be provided.

3. An appropriate table entry, as follows, should be made for INMARSAT-E in 47 CFR 80.1077:

INMARSAT -E EPIRB. . .1626.5–1645.5 MHz (Earth-to-space).

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4. A new subparagraph should be added to 47 CFR 80.1101(c), to list the standards applying to INMARSAT-E EPIRBs, as follows:

(11) *INMARSAT-E EPIRBs:*

(i) IMO Resolution A.812(19), Performance standards for float-free satellite EPIRBs operating through the geostationary INMARSAT satellite system on 1.6 GHz adopted 23 November 1995.

(ii) IMO Resolution A.662(16), ‘‘Performance Standards for Float-free Release and Activation Arrangements for Emergency Radio Equipment,’’ adopted 19 October 1989.

(iii) Recommendation ITU-R M.632-3 (formerly CCIR Recommendation 632), Transmission characteristics of a satellite emergency indicating radio beacon (Satellite EPIRB) system operating through geostationary satellites in the 1,6 GHz band),1997.

(iv) The INMARSAT-E EPIRBs must also comply with § [80.1063].

In regard to Ship Radar, Section 80.273:

The current rule section 80.273 has been outdated by changes on the Safety of Life at Sea Convention, performance standards of the International Maritime Organization, Recommendations of the International Telecommunication Union Radiocommunication Sector, and technical testing standards of the International Electrotechnical Commission. While much of the work has been completed, there is still substantial work in progress that should be incorporated in the Commission’s Rules when applicable documentation has been finally approved.

The RTCM considered proposing at this time incorporation in the Commission’s Rules of those radar changes for which there new approved standards, however the “gaps” that would still remain in specifying requirements create more confusion than clarification in defining new requirements.

In consequence the RTCM respectfully recommends that the Commission:

(1) Incorporate in the existing Section 80.273 an advisory statement noting that internationally substantial changes in ship radar carriage requirements, technical characteristics, performance requirements and technical testing standards are under development and will be incorporated in the Commission’s Rules when completed. Further, that in the interim consideration will be given by the Commission to requests for waiver of existing Rules for equipment meeting new radar standards that have not yet been incorporated in the Rules.

(2) Issue a Further Notice of Proposed Rulemaking in this proceeding early in 2003 in order to revise the entire radar rules section to take into account the new IMO, ITU and IEC standards, all of which should be completed by that time..

In regard to Special requirements for 406.0-406.1 MHz EPIRB stations, Section 80.1061.

In its Report and Order, the Commission published a Final Rule on 406.0-406.1 EPRIB stations. RTCM fully supports the revised regulations, but notes that some technical corrections are needed, specifically:

1. The version 2.1 of the RTCM standard dated August 22, 2000 and cited in section 80.1061(a) refers to a draft of Version 2.1 which did not include the particulars of transmission on the new 406.028 MHz frequency. That document is archived in the RTCM files, as RTCM PAPER 77-2002/SC110-STD. The final published standard takes this frequency information into account. There are no other significant differences between the August 22, 2000 draft version and the final published standard, which is identified as RTCM Recommended Standards for 406 MHz Satellite Emergency Position-Indicating Radiobeacons (EPIRBs), Version 2.1, June 20, 2002 (RTCM PAPER 77-2002/SC110-STANDARD.).

2. The preferred way of ordering RTCM standards is through RTCM's secure Website. We therefore suggest that the RTCM Web address be listed for ordering this standard in section 80.1061(a).

3. Section in sectionm 80.1061(c) requires certification of the radiobeacon to Appendix B of the RTCM standard by a test facility recognized by one of the COSPAS/SARSAT Partners. The "Appendix B" referred to was removed from version 2.1 of the RTCM standard to eliminate needless duplication of COSPAS-SARSAT standards T.001 and T.007. Version 2.1 of the RTCM standard only contains the Appendix A tests of the previous version. The RTCM tests are conducted by test facilities accepted by the U.S. Coast Guard. Furthermore, in § 80.1061(d), it is clear that it is the Coast Guard, and not the test facility, that does the certification to the RTCM standards. RTCM suggests that § 80.1061(c) be revised to reflect these changes and practices.

Accordingly, RTCM recommends that sections 80.1061(a) and (c) be revised as follows:

(a) Notwithstanding the provisions in paragraph (b) of this section, 406.0-406.1 MHz EPIRBs must meet all the technical and performance standards contained in the Radio Technical Commission for Maritime Services document titled "RTCM Recommended Standards for 406 MHz Satellite Emergency Position-Indicating Radiobeacons (EPIRBs)" version 2.1 (RTCM PAPER 77-2002/SC110-STANDARD), dated June 20, 2002 (RTCM Recommended Standards). This RTCM document is incorporated by reference in accordance with 5 U.S.C. 552(a). The document is available for inspection at Commission headquarters in Washington, D.C. or may be obtained from the Radio Technical Commission for Maritime Services, 1800 Diagonal Road, Suite 600, Alexandria, VA 22314. Phone 703-684-4481; Fax 703-684-4229; www.rtcm.org.

* * *

(c) Prior to submitting a certification application for a 406.0-406.1 MHz radiobeacon, the radiobeacon must be certified by a test facility recognized by one of the COSPAS/SARSAT Partners that the equipment satisfies the design characteristics associated with the measurement methods described in COSPAS-SARSAT Standards T.001, Specification for Cospas-Sarsat 406 MHz Distress Beacons, Issue 3 - Revision 3, with Corrigendum 1 (October 1999) and T.007, Cospas-Sarsat 406 MHz Distress Beacon Type Approval Standard, Issue 3 - Revision 8 (October 2001). Additionally, the radiobeacon must be subjected to the environmental and operational tests associated with the test procedures described in Appendix A of the RTCM Recommended Standards by a test facility accepted by the U.S. Coast Guard for this purpose. Information regarding accepted test facilities may be obtained from Commandant (G-MSE), U.S. Coast Guard, 2100 2nd Street SW, Washington, DC 20593-0001, http://www.uscg.mil/hq/g-m/mse/lablist/161.011.htm. The COSPAS/SARSAT standards are available for inspection at Commission headquarters in Washington, D.C. or may be obtained from Cospas-Sarsat Secretariat, c/o Inmarsat, 99 City Road, London EC1Y 1AX, United Kingdom, Telephone: +44 20-7728 1391, Facsimile: +44 20-7728 1170; www.cospas-sarsat.org.

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